



SEQUENCE LISTING

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Yabuta, Masayuki
Suzuki, Yuji

<120> Process for Producing Peptides Using a
Helper Peptide

<130> 001560-373

<140> US 09/402,093

<141> 1999-09-29

<150> PCT/JP99/00406

<151> 1999-01-29

<150> JP 10-32272

<151> 1998-01-30

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<211> 4

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Asp Asp Asp Lys

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<223> Amino acid sequence adjacent to a site cleaved by
blood coagulation Factor Xa

<400> 2

Ile Glu Gly Arg

1

<210> 3

<211> 7

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<213> Artificial Sequence

<220>

<223> Amino acid sequence containing a site cleaved by
renin

<400> 3

Pro Phe His Leu Leu Val Tyr

1

5

<210> 4

<211> 6

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of helper peptide

<400> 4

Val Asp Asp Asp Asp Lys

1

5

<210> 5

<211> 6

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of helper peptide

<400> 5

Gly Cys His His His His

1

5

<210> 6

<211> 10

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence containing a chemically
cleaved site

<400> 6

Pro Gly Gly Arg Pro Ser Arg His Lys Arg

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10

<210> 7

<211> 10

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<213> Artificial Sequence

<220>

<223> Amino acid sequence of helper peptide

<400> 7

His Arg His Lys Arg Ser His His His His
1 5 10

<210> 8

<211> 5

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence containing a site cleaved by
Kex2 Protease

<400> 8

Ser Asp His Lys Arg
1 5

<210> 9

<211> 23

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence containing a position cleaved
by OmpT

<400> 9

Gln Met His Gly Tyr Asp Ala Glu Leu Arg Leu Tyr Arg Arg His His
1 5 10 15
Arg Trp Gly Arg Ser Gly Ser
20

<210> 10

<211> 20

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence containing a position cleaved
by OmpT

<400> 10

Gln Met His Gly Tyr Asp Ala Glu Leu Arg Leu Tyr Arg Arg His His
1 5 10 15
Gly Ser Gly Ser
20

<210> 11

<211> 69

<212> DNA

<213> Artificial Sequence

<220>

<223> Nucleotide sequence coding for an amino acid
sequence containing a site cleaved by OmpT

<400> 11

cagatgcatg gttatgacgc ggagctccgg ctgtatcgcc gtcacaccg gtggggtcgt 60
tccgatcc 69

<210> 12

<211> 23

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence containing a site cleaved by
OmpT

<400> 12

Gln Met His Gly Tyr Asp Ala Glu Leu Arg Leu Tyr Arg Arg His His
1 5 10 15
Arg Trp Gly Arg Ser Gly Ser
20

<210> 13

<211> 47

<212> DNA

<213> Artificial Sequence

<220>

<223> Nucleotide sequence coding for an amino acid
sequence containing a site cleaved by OmpT

<400> 13

tggttatgac gcggagctcc gcctgtatcg ccgtcatcac gggtccg 47

<210> 14

<211> 55

<212> DNA

<213> Artificial Sequence

<220>

<223> Nucleotide sequence coding for an amino acid
sequence containing a site cleaved by OmpT

<400> 14

gatccggaac cgtgatgacg gcgatacagg cggagctccg cgtcataacc atgca 55

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<211> 24

<212> DNA

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<220>

<223> Primer

<400> 15

gactcagatc ttcctgaggc cgat 24

<210> 16
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<220>
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<400> 16
 aaaggtacct tccgcatgcc gcggatgtcg agaagg 36

<210> 17
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<220>
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<400> 17
 aggccaggaa ccgtaaaaag 20

<210> 18
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 <212> DNA
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<220>
 <223> Primer

<400> 18
 aaaatgcac gcacgtaac cgtgcatct 29

<210> 19
 <211> 627
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<220>
 <223> Nucleotide sequence coding for a fusion protein
 comprising GLP-1, helper peptide and
 beta-galactosidase protective peptide

<221> CDS
 <222> (82) ... (543)

<400> 19
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 aatttcacac aggaaacagc t atg acc atg att acg gat tca ctg gcc gtc 111
 Met Thr Met Ile Thr Asp Ser Leu Ala Val
 1 5 10

ggt tta caa cgt aaa gac tgg gat aac cct ggc gtt acc caa ctt aat 159
 Val Leu Gln Arg Lys Asp Trp Asp Asn Pro Gly Val Thr Gln Leu Asn
 15 20 25

cgc ctt gca gca cat ccc cct ttc gcc agc tgg cgt aat agc gac gac 207
 Arg Leu Ala Ala His Pro Pro Phe Ala Ser Trp Arg Asn Ser Asp Asp
 30 35 40

gcc cgc acc gat cgc cct tcc caa cag ttg cgc agc ctg aat ggc gaa 255
 Ala Arg Thr Asp Arg Pro Ser Gln Gln Leu Arg Ser Leu Asn Gly Glu
 45 50 55

tgg cgc ttt gcc tgg ttt ccg gca cca gaa gcg gtg ccg gca agc ttg 303
 Trp Arg Phe Ala Trp Phe Pro Ala Pro Glu Ala Val Pro Ala Ser Leu
 60 65 70

ctg gag tca gat ctt cct gag gcc gat act gtc gtc gtc ccc tca aac 351
 Leu Glu Ser Asp Leu Pro Glu Ala Asp Thr Val Val Val Pro Ser Asn
 75 80 85 90

tgg cag atg cac ggt tac gat gcg atg cat ggt tat gac gcg gag ctc 399
 Trp Gln Met His Gly Tyr Asp Ala Met His Gly Tyr Asp Ala Glu Leu
 95 100 105

cgc ctg tat cgc cgt cat cac ggt tcc gga tcc cct tct cga cat ccg 447
 Arg Leu Tyr Arg Arg His His Gly Ser Gly Ser Pro Ser Arg His Pro
 110 115 120

cgg cat gcg gaa ggt acc ttt acc agc gat gtg agc tcg tat ctg gaa 495
 Arg His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu
 125 130 135

ggt cag gcg gca aaa gaa ttc atc gcg tgg ctg gtg aaa ggc cgt ggt 543
 Gly Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg Gly
 140 145 150

taagtcgaca gcccgccctaa tgagcgggct tttttttctc ggaattaatt ctcatgtttg 603
 acagcttatc atcgataagc ttta 627

<210> 20

<211> 154

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of a fusion protein comprising
 GLP-1, helper peptide and beta-galactosidase
 protective peptide

<400> 20

Met Thr Met Ile Thr Asp Ser Leu Ala Val Val Leu Gln Arg Lys Asp
 1 5 10 15
 Trp Asp Asn Pro Gly Val Thr Gln Leu Asn Arg Leu Ala Ala His Pro
 20 25 30
 Pro Phe Ala Ser Trp Arg Asn Ser Asp Ala Arg Thr Asp Arg Pro
 35 40 45
 Ser Gln Gln Leu Arg Ser Leu Asn Gly Glu Trp Arg Phe Ala Trp Phe
 50 55 60
 Pro Ala Pro Glu Ala Val Pro Ala Ser Leu Leu Glu Ser Asp Leu Pro
 65 70 75 80

Glu	Ala	Asp	Thr	Val	Val	Val	Pro	Ser	Asn	Trp	Gln	Met	His	Gly	Tyr
				85					90					95	
Asp	Ala	Met	His	Gly	Tyr	Asp	Ala	Glu	Leu	Arg	Leu	Tyr	Arg	Arg	His
			100					105					110		
His	Gly	Ser	Gly	Ser	Pro	Ser	Arg	His	Pro	Arg	His	Ala	Glu	Gly	Thr
		115					120					125			
Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly	Gln	Ala	Ala	Lys	Glu
	130					135					140				
Phe	Ile	Ala	Trp	Leu	Val	Lys	Gly	Arg	Gly						
145					150										

<210> 21
 <211> 187
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Amino acid sequence of a fusion protein comprising
 GLP-1, helper peptide and beta-galactosidase
 protective peptide

Met	Thr	Met	Ile	Thr	Asp	Ser	Leu	Ala	Val	Val	Leu	Gln	Arg	Lys	Asp
1				5					10					15	
Trp	Asp	Asn	Pro	Gly	Val	Thr	Gln	Leu	Asn	Arg	Leu	Ala	Ala	His	Pro
			20					25					30		
Pro	Phe	Ala	Ser	Trp	Arg	Asn	Ser	Asp	Asp	Ala	Arg	Thr	Asp	Arg	Pro
		35				40						45			
Ser	Gln	Gln	Leu	Arg	Ser	Leu	Asn	Gly	Glu	Trp	Arg	Phe	Ala	Trp	Phe
	50				55						60				
Pro	Ala	Pro	Glu	Ala	Val	Pro	Ala	Ser	Leu	Leu	Glu	Ser	Asp	Leu	Pro
65					70					75				80	
Glu	Ala	Asp	Thr	Val	Val	Pro	Ser	Asn	Trp	Gln	Met	His	Gly	Tyr	
				85				90					95		
Asp	Ala	Pro	Ile	Tyr	Thr	Asn	Val	Thr	Tyr	Pro	Ile	Thr	Val	Asn	Pro
			100					105					110		
Pro	Phe	Val	Pro	Thr	Glu	Pro	His	His	His	His	His	Gly	Gly	Arg	Gln
		115					120					125			
Met	His	Gly	Tyr	Asp	Ala	Glu	Leu	Arg	Leu	Tyr	Arg	Arg	His	His	Arg
	130					135					140				
Trp	Gly	Arg	Ser	Gly	Ser	Pro	Ser	Arg	His	Lys	Arg	His	Ala	Glu	Gly
145					150					155				160	
Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly	Gln	Ala	Ala	Lys
			165					170					175		
Glu	Phe	Ile	Ala	Trp	Leu	Val	Lys	Gly	Arg	Gly					
			180					185							

<210> 22
 <211> 184
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Amino acid sequence of a fusion protein comprising
 GLP-1, helper peptide and beta-galactosidase

protective peptide

<400> 22

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Met Thr Met Ile Thr Asp Ser Leu Ala Val Val Leu Gln Arg Lys Asp
 1           5           10           15
Trp Asp Asn Pro Gly Val Thr Gln Leu Asn Arg Leu Ala Ala His Pro
          20           25           30
Pro Phe Ala Ser Trp Arg Asn Ser Asp Asp Ala Arg Thr Asp Arg Pro
          35           40           45
Ser Gln Gln Leu Arg Ser Leu Asn Gly Glu Trp Arg Phe Ala Trp Phe
 50           55           60
Pro Ala Pro Glu Ala Val Pro Ala Ser Leu Leu Glu Ser Asp Leu Pro
65           70           75           80
Glu Ala Asp Thr Val Val Val Pro Ser Asn Trp Gln Met His Gly Tyr
          85           90           95
Asp Ala Pro Ile Tyr Thr Asn Val Thr Tyr Pro Ile Thr Val Asn Pro
          100          105          110
Pro Phe Val Pro Thr Glu Pro His His His His Gly Gly Arg Gln
          115          120          125
Met His Gly Tyr Asp Ala Glu Leu Arg Leu Tyr Arg Arg His His Glu
          130          135          140
Ser Gly Ser Pro Ser Arg His Lys Arg His Ala Glu Gly Thr Phe Thr
145           150           155           160
Ser Asp Val Ser Ser Tyr Leu Glu Gly Gln Ala Ala Lys Glu Phe Ile
          165           170           175
Ala Trp Leu Val Lys Gly Arg Gly
          180

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<210> 23

<211> 184

<212> PRT

<213> Artificial Sequence

<220>

<223> Amino acid sequence of a fusion protein comprising
GLP-1, helper peptide and beta-galactosidase
protective peptide

<400> 23

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Met Thr Met Ile Thr Asp Ser Leu Ala Val Val Leu Gln Arg Lys Asp
 1           5           10           15
Trp Asp Asn Pro Gly Val Thr Gln Leu Asn Arg Leu Ala Ala His Pro
          20           25           30
Pro Phe Ala Ser Trp Arg Asn Ser Asp Asp Ala Arg Thr Asp Arg Pro
          35           40           45
Ser Gln Gln Leu Arg Ser Leu Asn Gly Glu Trp Arg Phe Ala Trp Phe
 50           55           60
Pro Ala Pro Glu Ala Val Pro Ala Ser Leu Leu Glu Ser Asp Leu Pro
65           70           75           80
Glu Ala Asp Thr Val Val Val Pro Ser Asn Trp Gln Met His Gly Tyr
          85           90           95
Asp Ala Pro Ile Tyr Thr Asn Val Thr Tyr Pro Ile Thr Val Asn Pro
          100          105          110
Pro Phe Val Pro Thr Glu Pro His His His His Gly Gly Arg Gln
          115          120          125
Met His Gly Tyr Asp Ala Glu Leu Arg Leu Tyr Arg Arg His His Glu

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	130				135					140							
Ser	Gly	Ser	Pro	Ser	Arg	His	Lys	Arg	His	Ala	Glu	Gly	Thr	Phe	Thr		
145					150					155					160		
Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly	Gln	Ala	Ala	Lys	Glu	Phe	Ile		
				165					170					175			
Ala	Trp	Leu	Val	Lys	Gly	Arg	Gly										
			180														

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 <223> Amino acid sequence containing a site cleaved by
 Kex2 Protease

<400> 24
 Ser Cys His Lys Arg
 1 5

<210> 25
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<220>
 <223> Amino acid sequence containing a site cleaved by
 Kex2 Protease

<221> PEPTIDE
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 <223> Xaa = Gly

<400> 25
 Arg His His Gly Pro Xaa
 1 5

<210> 26
 <211> 37
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> GLP-1

<400> 26
 His Asp Glu Phe Glu Arg His Ala Glu Gly Thr Phe Thr Ser Asp Val
 1 5 10 15
 Ser Ser Tyr Leu Glu Gly Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu
 20 25 30
 Val Lys Gly Arg Gly
 35

<210> 27
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> GLP-1

<221> VARIANT
<222> 30
<223> Amino acid 30 is attached by NH2

<400> 27
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly
1 5 10 15
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg
20 25 30

<210> 28
<211> 31
<212> PRT
<213> Artificial Sequence

<220>
<223> GLP-1

<400> 28
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly
1 5 10 15
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg Gly
20 25 30

<210> 29
<211> 28
<212> PRT
<213> Artificial Sequence

<220>
<223> GLP-1

<400> 29
His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly
1 5 10 15
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys
20 25

<210> 30
<211> 29
<212> PRT
<213> Artificial Sequence

<220>
<223> GLP-1

<400> 30

His	Ala	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	
Gln	Ala	Ala	Lys	Glu	Phe	Ile	Ala	Trp	Leu	Val	Lys	Gly			
			20					25							

<210> 31

<211> 30

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<400> 31

His	Ala	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	
Gln	Ala	Ala	Lys	Glu	Phe	Ile	Ala	Trp	Leu	Val	Lys	Gly	Arg		
			20					25					30		

<210> 32

<211> 28

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<221> VARIANT

<222> 28

<223> Amino acid 28 is attached by NH2

<400> 32

His	Ala	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	
Gln	Ala	Ala	Lys	Glu	Phe	Ile	Ala	Trp	Leu	Val	Lys				
			20					25							

<210> 33

<211> 29

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<221> VARIANT

<222> 29

<223> Amino acid 29 is attached by NH2

<400> 33

His	Ala	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	

Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly
20 25

<210> 34

<211> 31

<212> PRT

<213> Artificial Sequence

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<223> GLP-1

<221> VARIANT

<222> 31

<223> Amino acid 31 is attached by NH2

<400> 34

His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly
1 5 10 15
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg Gly
20 25 30

<210> 35

<211> 32

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<400> 35

His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly
1 5 10 15
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg Gly Arg
20 25 30

<210> 36

<211> 33

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<400> 36

His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly
1 5 10 15
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg Gly Arg
20 25 30
Arg

<210> 37

<211> 32

<212> PRT
<213> Artificial Sequence

<220>
<223> GLP-1

<400> 37

His	Ala	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10				15		
Gln	Ala	Ala	Lys	Glu	Phe	Ile	Ala	Trp	Leu	Val	Lys	Gly	Arg	Gly	Lys
			20					25					30		

<210> 38
<211> 33
<212> PRT
<213> Artificial Sequence

<220>
<223> GLP-1

<400> 38

His	Ala	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10				15		
Gln	Ala	Ala	Lys	Glu	Phe	Ile	Ala	Trp	Leu	Val	Lys	Gly	Arg	Gly	Lys
			20					25					30		

Lys

<210> 39
<211> 33
<212> PRT
<213> Artificial Sequence

<220>
<223> GLP-1

<400> 39

His	Ala	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10				15		
Gln	Ala	Ala	Lys	Glu	Phe	Ile	Ala	Trp	Leu	Val	Lys	Gly	Arg	Gly	Lys
			20					25					30		

Arg

<210> 40
<211> 33
<212> PRT
<213> Artificial Sequence

<220>
<223> GLP-1

<400> 40

His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly

1	5	10	15												
Gln	Ala	Ala	Lys	Glu	Phe	Ile	Ala	Trp	Leu	Val	Lys	Gly	Arg	Gly	Arg
	20							25					30		

Lys

<210> 41
 <211> 31
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> GLP-1

<221> VARIANT
 <222> 2
 <223> Xaa = Thr, Gly, Ser

<400> 41
His Xaa Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly
1 5 10 15
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg Gly
20 25 30

<210> 42
 <211> 30
 <212> PRT
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<220>
 <223> GLP-1

<221> VARIANT
 <222> 30
 <223> Amino acid 30 is attached by NH2

<221> VARIANT
 <222> 2
 <223> Xaa = Thr, Gly, Ser

<400> 42
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1 5 10 15
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Arg
20 25 30

<210> 43
 <211> 31
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> GLP-1

<400> 43

His	Ala	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5				10					15		
Gln	Ala	Ala	Arg	Glu	Phe	Ile	Ala	Trp	Leu	Val	Lys	Gly	Arg	Gly	
			20					25					30		

<210> 44

<211> 30

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<221> VARIANT

<222> 30

<223> Amino acid 30 is attached by NH2

<400> 44

His	Ala	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5				10					15		
Gln	Ala	Ala	Arg	Glu	Phe	Ile	Ala	Trp	Leu	Val	Lys	Gly	Arg		
			20					25					30		

<210> 45

<211> 31

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<400> 45

His	Ala	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5				10					15		
Gln	Ala	Ala	Lys	Glu	Phe	Ile	Ala	Trp	Leu	Val	Arg	Gly	Arg	Gly	
			20					25					30		

<210> 46

<211> 30

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<221> VARIANT

<222> 30

<223> Amino acid 30 is attached by NH2

<400> 46

His	Ala	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5				10					15		
Gln	Ala	Ala	Lys	Glu	Phe	Ile	Ala	Trp	Leu	Val	Arg	Gly	Arg		

20

25

30

<210> 47
 <211> 31
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> GLP-1

<400> 47
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 1 5 10 15
 Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Lys Gly
 20 25 30

<210> 48
 <211> 30
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> GLP-1

<221> VARIANT
 <222> 30
 <223> Amino acid 30 is attached by NH2

<400> 48
 His Ala Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly
 1 5 10 15
 Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Lys Gly Lys
 20 25 30

<210> 49
 <211> 31
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> GLP-1

<221> VARIANT
 <222> 2
 <223> Xaa = Thr, Gly, Ser

<400> 49
 His Xaa Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly
 1 5 10 15
 Gln Ala Ala Arg Glu Phe Ile Ala Trp Leu Val Lys Gly Arg Gly
 20 25 30

<210> 50

<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> GLP-1

<221> VARIANT
<222> 30
<223> Amino acid 30 is attached by NH2

<221> VARIANT
<222> 2
<223> Xaa = Thr, Gly, Ser

<400> 50
His Xaa Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly
1 5 10 15
Gln Ala Ala Arg Glu Phe Ile Ala Trp Leu Val Lys Gly Arg
20 25 30

<210> 51
<211> 31
<212> PRT
<213> Artificial Sequence

<220>
<223> GLP-1

<221> VARIANT
<222> 2
<223> Xaa = Thr, Gly, Ser

<400> 51
His Xaa Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly
1 5 10 15
Gln Ala Ala Lys Glu Phe Ile Ala Trp Leu Val Arg Gly Arg Gly
20 25 30

<210> 52
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> GLP-1

<221> VARIANT
<222> 30
<223> Amino acid 30 is attached by NH2

<221> VARIANT
<222> 2
<223> Xaa = Thr, Gly, Ser

<400> 52

His	Xaa	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	
Gln	Ala	Ala	Lys	Glu	Phe	Ile	Ala	Trp	Leu	Val	Arg	Gly	Arg		
			20					25					30		

<210> 53

<211> 31

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<221> VARIANT

<222> 2

<223> Xaa = Thr, Gly, Ser

<400> 53

His	Xaa	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	
Gln	Ala	Ala	Lys	Glu	Phe	Ile	Ala	Trp	Leu	Val	Lys	Gly	Lys	Gly	
			20					25					30		

<210> 54

<211> 30

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<221> VARIANT

<222> 30

<223> Amino acid 30 is attached by NH2

<221> VARIANT

<222> 2

<223> Xaa = Thr, Gly, Ser

<400> 54

His	Xaa	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	
Gln	Ala	Ala	Lys	Glu	Phe	Ile	Ala	Trp	Leu	Val	Lys	Gly	Lys		
			20					25					30		

<210> 55

<211> 31

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<400> 55

His	Ala	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	
Gln	Ala	Ala	Arg	Glu	Phe	Ile	Ala	Trp	Leu	Val	Arg	Gly	Arg	Gly	
			20					25					30		

<210> 56

<211> 30

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<221> VARIANT

<222> 30

<223> Amino acid 30 is attached by NH2

<400> 56

His	Ala	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	
Gln	Ala	Ala	Arg	Glu	Phe	Ile	Ala	Trp	Leu	Val	Arg	Gly	Arg		
			20					25					30		

<210> 57

<211> 31

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<400> 57

His	Ala	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	
Gln	Ala	Ala	Arg	Glu	Phe	Ile	Ala	Trp	Leu	Val	Lys	Gly	Lys	Gly	
			20					25					30		

<210> 58

<211> 30

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<221> VARIANT

<222> 30

<223> Amino acid 30 is attached by NH2

<400> 58

His	Ala	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	
Gln	Ala	Ala	Arg	Glu	Phe	Ile	Ala	Trp	Leu	Val	Lys	Gly	Lys		

20

25

30

<210> 59

<211> 31

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<400> 59

His	Ala	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	
Gln	Ala	Ala	Lys	Glu	Phe	Ile	Ala	Trp	Leu	Val	Arg	Gly	Lys	Gly	
			20					25					30		

<210> 60

<211> 30

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<221> VARIANT

<222> 30

<223> Amino acid 30 is attached by NH2

<400> 60

His	Ala	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	
Gln	Ala	Ala	Lys	Glu	Phe	Ile	Ala	Trp	Leu	Val	Arg	Gly	Lys		
			20					25					30		

<210> 61

<211> 31

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<221> VARIANT

<222> 2

<223> Xaa = Thr, Gly, Ser

<400> 61

His	Xaa	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	
Gln	Ala	Ala	Arg	Glu	Phe	Ile	Ala	Trp	Leu	Val	Arg	Gly	Arg	Gly	
			20					25					30		

<210> 62

<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> GLP-1

<221> VARIANT
<222> 30
<223> Amino acid 30 is attached by NH2

<221> VARIANT
<222> 2
<223> Xaa = Thr, Gly, Ser

<400> 62
His Xaa Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly
1 5 10 15
Gln Ala Ala Arg Glu Phe Ile Ala Trp Leu Val Arg Gly Arg
20 25 30

<210> 63
<211> 31
<212> PRT
<213> Artificial Sequence

<220>
<223> GLP-1

<221> VARIANT
<222> 2
<223> Xaa = Thr, Gly, Ser

<400> 63
His Xaa Glu Gly Thr Phe Thr Ser Asp Val Ser Ser Tyr Leu Glu Gly
1 5 10 15
Gln Ala Ala Arg Glu Phe Ile Ala Trp Leu Val Lys Gly Lys Gly
20 25 30

<210> 64
<211> 30
<212> PRT
<213> Artificial Sequence

<220>
<223> GLP-1

<221> VARIANT
<222> 30
<223> Amino acid 30 is attached by NH2

<221> VARIANT
<222> 2
<223> Xaa = Thr, Gly, Ser

<400> 64

His	Xaa	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	
Gln	Ala	Ala	Arg	Glu	Phe	Ile	Ala	Trp	Leu	Val	Lys	Gly	Lys		
			20					25					30		

<210> 65

<211> 31

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<221> VARIANT

<222> 2

<223> Xaa = Thr, Gly, Ser

<400> 65

His	Xaa	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	
Gln	Ala	Ala	Lys	Glu	Phe	Ile	Ala	Trp	Leu	Val	Arg	Gly	Lys	Gly	
			20					25					30		

<210> 66

<211> 30

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<221> VARIANT

<222> 30

<223> Amino acid 30 is attached by NH2

<221> VARIANT

<222> 2

<223> Xaa = Thr, Gly, Ser

<400> 66

His	Xaa	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	
Gln	Ala	Ala	Lys	Glu	Phe	Ile	Ala	Trp	Leu	Val	Arg	Gly	Lys		
			20					25					30		

<210> 67

<211> 31

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<400> 67

His	Ala	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	
Gln	Ala	Ala	Arg	Glu	Phe	Ile	Ala	Trp	Leu	Val	Arg	Gly	Lys	Gly	
			20					25					30		

<210> 68

<211> 30

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<221> VARIANT

<222> 30

<223> Amino acid 30 is attached by NH2

<400> 68

His	Ala	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	
Gln	Ala	Ala	Arg	Glu	Phe	Ile	Ala	Trp	Leu	Val	Arg	Gly	Lys		
			20					25					30		

<210> 69

<211> 31

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<221> VARIANT

<222> 2

<223> Xaa = Thr, Gly, Ser

<400> 69

His	Xaa	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	
Gln	Ala	Ala	Arg	Glu	Phe	Ile	Ala	Trp	Leu	Val	Arg	Gly	Lys	Gly	
			20					25					30		

<210> 70

<211> 30

<212> PRT

<213> Artificial Sequence

<220>

<223> GLP-1

<221> VARIANT

<222> 30

<223> Amino acid 30 is attached by NH2

<221> VARIANT

<222> 2

<223> Xaa = Thr, Gly, Ser

<400> 70

His	Xaa	Glu	Gly	Thr	Phe	Thr	Ser	Asp	Val	Ser	Ser	Tyr	Leu	Glu	Gly
1				5					10					15	
Gln	Ala	Ala	Arg	Glu	Phe	Ile	Ala	Trp	Leu	Val	Arg	Gly	Lys		
			20					25					30		